

How do you make elements?

Well, you first need
protons and electrons.
Hydrogen is a good start -
that's one proton, one
electron.

**Okay, I got a whole bunch of
hydrogen. What do I do now?**

Nothing. Let gravity do the
work. Your hydrogen -
supposing you have enough -
will coalesce, heat up and
eventually form a star.
Take a step back - it will
be a big one.

**Hey! My hydrogen is burning hot!
What's going on?**

Don't panic. The combination of pressure and heat packs your protons so closely that they overcome electromagnetic repulsion and stick together. This is called fusion, and this produces a lot of energy - solar energy, in fact.

**Now what? I have atoms with two
protons - but complex atoms
have protons and neutrons.
Where are my neutrons?**

One of your proton will
decay into a neutron (and
release a gamma ray - time
to put on those
sunglasses...).

Neat! I have helium, now - two protons, two neutrons. How do I get other elements such as oxygen, carbon?

Provided your star is big enough, some of your helium should turn into lithium, then into nitrogen, carbon, oxygen, all the way up to iron. Let gravity do the job.

Yippee! I have iron! That's so cool, I want to have heavier elements, up to uranium! How can I do that?

Oh, you don't wanna do that...

Yes I do.

So you got iron, right? That means your star is quite big. Take a step back.

Okay, I took a step back.

Further. It's gonna blow.

WHAT???

Yep, you've got a supernova, the largest explosion in the universe. In the process, it will create all these heavy elements you want.

Great, I got a cloud of gas, now. Back to square one.

Yep, but this one has all the elements to make planets. Congratulations: you can now make planets!

Yes I do.

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